TCT-302

Novel Index of Myocardial Mass At Risk Calculated From Cardiac Computed Tomography Data Had Significant Correlation With Two Angiographic Scores In Patients With Left Coronary Artery Stenosis

Seiko Ide[1], Satoru Sumitsuji[1], Kensuke Yokoi[1], Masatoki Yoshida[1], Isamu Mizote[1], Masaki Awata[1], Keita Yamasaki[1], Koichi Tachibana[1], Shinsuke Nanto[1], Yasushi Sakata[1]

[1]Osaka University Graduate School of Medicine, Suita, Osaka, Japan

Background: The importance of extent and severity of ischemic area in predicting cardiac adverse event was clarified in previous studies. However, current myocardium perfusion imaging technique fails to provide quantitative measurement in good correlation with myocardium mass at risk (MMAR) speculated with coronary angiogram (CAG). The novel software, developed on specific algorithm utilized in structural analysis of liver vasculature, obtains row cardiac computed tomography (CCT) data and calculates the MMAR of any designated coronary artery. In normal coronary artery with co-dominant vascular type, the novel index, ratio of MMAR to whole left ventricular volume (%LV-MMAR), calculated with this software was shown to have good correlation with published data of perfusion territory examined in cadaver heart. This study aims, in patients with left coronary artery stenosis, to validate the agreement of %LV-MMAR with Bypass Angioplasty Revascularization Investigation (BARI) and modified Albert Provincial Project for Outcome Assessment in Coronary Heart Disease (APPROACH) score.
Methods: Between April 2008 and September 2012, patients referred to Osaka Police Hospital with effort angina pectoris, were assessed both with CCT and CAG. Of those, 22 patients with left anterior descending artery as the single affected vessel were included in this study. %LV-MMAR was calculated on the software from CCT data. BARI and modified APPROACH score were calculated and compared with %LV-MMAR.
Results: Distal (n=1), mid (n=7) or proximal (n=14) left anterior descending arteries were affected in each patient. The median value of %LV-MMAR, BARI and APPROACH score were 37.9 [8.6-52.2] %, 37.8 [10.5-52.1] % and 41.3 [13.8-47.8] %, respectively. %LV-MMAR had significant correlation with BARI (r=0.95, p< 0.0001), and APPROACH score (r=0.91, p< 0.0001). In regard of intra-observer agreement, correlation index was 0.95 for BARI (p< 0.0001) and 0.98 for modified APPROACH score (p< 0.0001).
Conclusions: This study revealed %LV-MMAR, calculated from CCT data on novel software, to be a promising index, convenient to quantify the ischemic area in good agreement with BARI and modified APPROACH score.

TCT-303

The Geometric Effect of Aortic Stenosis On Aortoventricular Interface Anatomy As Assessed By Multi-detector Computerised Tomographic Imaging.

Robert Gooley[1], James Cameron[1], Sonia Ciavarella[1], Siobhan Lockwood[1], Paul Antonis[1], Ian T. Meredith[1]

[1]MonashHEART (Monash Health) and Monash Cardiovascular Research Centre (Monash University), Melbourne, Australia

Background: Multi-detector computerised tomographic (MDCT) imaging has become the gold-standard means of anatomical assessment prior to transcatheter aortic valve replacement. Little data exists regarding the effect of the disease process on the geometry of the aortoventricular interface, beyond the recognition of increased calcification. We sought to compare MDCT derived aortoventricular interface measurements between patients with aortic stenosis and age-matched controls.
Methods: 100 patients with severe calcific aortic stenosis underwent MDCT imaging. 100 age-matched controls were selected from patients who had undergone MDCT cardiac imaging with systolic phase images and a TTE within 6-months to exclude aortic valve pathology. All scans were analysed using the 3Mensio Valve analysis program (3Mensio, Bilthoven, Netherlands). Measurements were taken at the level of the basal plane (through the nadir of the coronary cusps), LVOT, SOV and ascending aorta.
Results: The mean AS and control cohorts were matched on age (83.4±5.5 vs 82.7±4.5yrs, p=0.31). Gender (46% vs 45% male, p=0.89), height (162.0±9.6 vs 161.9±10.2cm, p=0.93), weight (72.5±17.0 vs 72.5±13.8kg, p=0.98) and BMI (27.6±6.1 vs 27.6±4.7kg/m2, p=0.94) were similar between groups. The mean transaortic valve velocity was 4.42±0.43 vs 1.46±0.25mmHg (p< 0.001). The basal plane and LVOT was significantly less eccentric in the AS cohort, driven by a significantly larger minimum diameter (Table 1). Despite this statistical difference the numerical difference between the cohorts was small, < 5%. There was no difference in maximum diameter, perimeter or area measurements.

MDCT Derived Measurement		Aortic Stenosis	Matched Control	P-Value
Basal Plane	Minimum Diameter	21.4±2.5	20.5±2.5	**0.006**
	Maximum Diameter	27.1±2.7	26.7±2.5	0.31
	Eccentricity Index	0.21±0.05	0.23±0.06	**0.003**
	Perimeter	76.4±6.9	74.8±7.3	0.11
	Area	448.2±84.1	428.2±86.4	0.10
LVOT	Minimum Diameter	19.5±2.8	18.4±2.8	**0.005**
	Maximum Diameter	27.4±2.7	27.6±3.1	0.67
	Eccentricity Index	0.29±0.08	0.33±0.08	**<0.001**
	Perimeter	75.2±7.4	75.3±9.0	0.93
	Area	421.1±90.0	405.9±105.3	0.27
Sinus of Valsalva	Perimeter	105.2±14.6	108.4±12.7	0.10
	Area	842.8±195.1	842.8±195.1	0.10
Ascending Aorta	Diameter	33.5±3.4	32.9±3.2	0.21

Conclusions: The mean eccentricity of the basal plane and LVOT is less in patients with AS than age-matched controls. This may be due to aortic root stiffening and reduced compliance related to the calcific disease process.

TCT-304

Prospectively electrocardiogram-triggered high-pitch spiral acquisition Coronary Computed Tomography Angiography for assessment of BVS expansion: comparison with Optical Coherence Tomography

Alessio Mattesini[1], Maria G. D'Alfonso[1], Francesco Meucci[2], Gian Franco Gensini[3], Carlo Di Mario[4], Serafina Valente[3]

[1]Careggi Hospital, Florence, Italy, [2]Careggi hospital, Florence, Italy, [3]AOU Careggi, Florence, Italy, [4]Imperial College London, London, United Kingdom

Background: BVS metal-free struts allow unrestricted Optical Coherence Tomography (OCT) and Coronary Computed Tomography Angiography (CCTA) in-scaffold area assessment. Prospectively electrocardiogram-triggered high-pitch spiral CCTA acquisition is a promising low X-Ray dose protocol for BVS non invasive evaluation. The aim of this study is to evaluate the agreement between CCTA and OCT to assess the in-scaffold lumen area.
Methods: From January 1, 2014 and May 14, 2014 four patients undergoing coronary stenting with BVS under OCT guidance were examined with prospectively electrocardiogram-triggered high-pitch spiral CCTA before discharge. CCTA before discharge was performed in order to rule out the presence of sub-acute scaffold recoil when sub optimal scaffold expansion observed with post deployment OCT assessment. MLA, proximal and distal scaffold edge area obtained with OCT and CCTA were compared.
Results: Four patients treated with a total of six BVS were enrolled. Mean X-Ray dose per patients was 1.34±0.59 mSv. Mean CCTA contrast dose per patients was 58.78±10,30 mL. OCT vs CCTA Lumen area measurement compared as follow: MLA 5.86±1.77mm2 vs 6.12±1.21mm2; p=0.75, proximal edge area 7.81±2.98mm2 vs 8.05±2.84mm2; p=0.67, distal edge area 6.13±2.61mm2 vs 6.31±2.13 mm2; p=0.91. Example of comparison in Figure 1.
Conclusions: Agreement between low X-Ray dose CCTA and OCT to assess in-scaffold area is good. In the near future CCTA with prospectively electrocardiogram-triggered high-pitch spiral acquisition might represent the gold standard for quantitative and qualitative follow-up evaluation of BVS.